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(54) Title: ENCAPSULATED ADHESIVE SYSTEM FOR A LOAD-BEARING SUPPORT DEVICE (57) Abstract <p>The invention is directed to a load-bearing support device (20), such as a hook or the like, for attachment to a support surface (22). The support device (20) has at least one frangible capsule (34) containing at least one component of an adhesive material attached thereto. The frangible capsule (34) is ruptured to form an adhesive material on the rearward facing surface (28) of the support device (20) to bond the support device (20) to the support surface (22). The adhesive material provides the primary adhesive bond between the support device (20) and the support surface (22).</p> <div data-bbox="873 1144 1421 1648"></div>		

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ENCAPSULATED ADHESIVE SYSTEM
FOR A LOAD-BEARING SUPPORT DEVICE

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Technical Field of the Invention

The present invention relates to support devices, such as hooks and the like, that may be adhesively secured to a support surface, and more particularly to a plastic load-bearing support device having at least one rupturable capsule containing an adhesive material therein for adhesively securing the support device to the support surface.

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Background of the Invention

The use of load-bearing support devices, such as hooks, soap dishes, paper towel racks, and the like, are well-known in the art and are commonly used in consumer households. These types of devices ordinarily include adhesive material pre-applied to a rearwardly facing mounting surface of the device, thus facilitating convenient attachment to surfaces such as walls or doors. Examples of such constructions are illustrated in U.S. Patent No. 3,504,878 to Dressler and U.S. Patent No. 3,848,843 to Levy.

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Load-bearing support devices can be affixed to a support surface in a variety of ways. One manner includes the provision of a hydrophilic substrate coated with a moisture-activated adhesive, with the substrate bonded to the device such as by molding the device directly against the substrate. The moisture-activated adhesive, when moistened, is intended to bond to the surface against which it is pressed in order to attach the support device to that surface. When the adhesive thoroughly dries, it cures and adheres to the surface. Fibrous inserts made of materials such as wood or fabric have been

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used as hydrophilic substrates that permit the evaporation of moisture from the moisture-activated adhesive coated substrate after the device is affixed to a surface.

5 Although such support devices have enjoyed considerable commercial success, there are certain circumstances in which adhesion of the support device to a support surface could be improved. For example, fibrous inserts are used because moisture-activated
10 adhesive does not satisfactorily "stick" directly to plastic support devices. However, the use of fibrous inserts increases manufacturing costs. Moreover, if wood is used as the material for the fibrous insert, the wood may have a tendency to warp when it is
15 coated with the moisture-activated adhesive. This often interferes with securing the support device to the support surface.

 In addition, while moisture-activated adhesive adheres securely to many support surfaces,
20 it may not always adhere firmly to some surfaces in moisture-laden environments, such as a bathroom, or in humid environments, such as found in many parts of the world. Under these conditions, the moisture-activated adhesive may not thoroughly dry as desired
25 to secure the support device to the support surface. Thus, a different type of adhesive may be necessary to firmly adhere support devices to support surfaces in moisture-laden or a humid environments.

 Another example of a load-bearing support
30 device is shown in U.S. Patent No. 2,557,434 to Hoverder. Hoverder discloses a suction-cup that is adhered to a support surface primarily by suction. The device in Hoverder primarily relies upon the suction created by the suction-cup. As is well
35 known, suction cups have difficulty maintaining a tight seal under various conditions. Furthermore, as

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is well known, suction-cups do not securely adhere to all types of support surfaces.

In the Hoverder patent the action of the suction-cup is supplemented by an adhesive
5 arrangement including a ring of contact type adhesive that is spaced inwardly from the perimeter of the suction-cup, and a frangible capsule containing an adhesive material attached to the center of the suction-cup. The ring of adhesive and the adhesive
10 in the capsule are described in the Hoverder patent as rubber cement or glue. When the suction-cup is to be attached to a support surface, a protective cover is removed from the ring of adhesive and the suction-cup is pressed against the support surface. The
15 frangible capsule ruptures releasing adhesive. The adhesive is dispensed from the frangible capsule into the center of the suction-cup to counteract the forces of the suction-cup. The ring of adhesive and the adhesive dispensed from the capsule provide a
20 secondary means for adhering the suction-cup to the support surface.

Summary of the Invention

In accordance with the present invention, there is provided a support device, such as a hook or the like, for adhesive attachment to a support surface. Generally, the support device includes a molded plastic body member having a normally forward facing load bearing surface and a normally rearward facing mounting surface. The rearward facing mounting surface of a support device incorporating the present invention includes frangible adhesive containing capsule means mounted thereon adapted to be ruptured as the support device is pressed against the support surface dispense adhesive over the mounting surface of the support device to bond it to the support surface. The load bearing surface may include a hook or other means for attaching an object to, for supporting an article on, or for hanging an article from the support device.

A support device incorporating the present invention includes a body member, which may be rigid. The mounting surface of the body member may have frangible capsule means secured thereto. The frangible capsule means may include one or more frangible capsules. Each frangible capsule contains at least one component of an adhesive material therein.

In a support device incorporating the present invention, the frangible capsule means may be captured between the mounting surface of the support device and the support surface when the rearward facing surface of the body member is moved to engage the support surface to which the support device is to be attached. The capsule means ruptures as the support device is pushed against the support surface to release the adhesive and bond the support device to the support surface. The adhesive material is the primary means for attaching the body member to the

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support surface, and typically is the only means for doing so.

Alternatively, a support device incorporating the present invention may incorporate a frangible capsule means secured to a surface opposite to the rearward facing surface of the body member. A flexible cover or diaphragm secured to the body member captures the frangible capsule means between the opposite surface and the diaphragm. The frangible capsule means is ruptured when pressure is applied to the diaphragm. The body member includes passages therethrough to allow the adhesive material from the ruptured capsule means to flow onto the rearward facing surface to bond the support device to the support surface.

The adhesive material may be made of a wide variety of adhesives. For example, the adhesive material may be made of an adhesive that is suitable for adhering directly to plastic. Alternatively, the adhesive material may be one that is suitable for adhesion to an adhesive absorbent material made of a fibrous material, such as wood or fabric. The adhesive material may be viscous or slightly viscous and may be aqueous or non-aqueous. Thus, an adhesive material that would be suitable for adhering the support device to a support surface in a moisture-laden or humid environment can be used.

A one component or multiple component adhesive may be used. If a one component adhesive is used, the adhesive may be housed within a compartment defined by the outer wall of one or more frangible capsules, or the adhesive may be housed in interior compartments of a multi-compartmented capsule formed by inner walls. Such inner walls are intended to be stronger than the outer wall of the frangible capsule so the outer wall ruptures first to dispense the adhesive material in an even distribution along the

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rearward facing surface so that the body member can be firmly adhered to the support surface.

5 If a multiple component adhesive is used, the separate adhesive components may be contained in one or more compartments formed in each capsule. The compartments of a multi-compartmented capsules are separated by inner walls. If multi-compartmented capsules are used, the inner walls are rupturable prior to the rupture of the outer wall of the frangible capsule to facilitate mixing of the adhesive components together to form the adhesive material. The outer wall of such a frangible capsule ruptures after the inner walls have ruptured to dispense the adhesive material onto the mounting surface so that the body member can be firmly adhered to the support surface.

10 As indicated above, if the frangible capsule means includes two or more frangible capsules, each capsule may contain a one component adhesive or a separate component of a multi-component adhesive material. Each frangible capsule may be separately attached to the body member, or alternatively, multiple frangible capsules may be stacked one on the other.

25 A load-bearing support device incorporating the present invention may include a structure which acts as an adhesive retaining member formed as a part of or attached to the mounting surface which generally surrounds the frangible capsule means and defines the area intended to receive the adhesive. The adhesive retaining member functions to contain the adhesive material therewithin after the capsule means have been ruptured. The adhesive retaining member may be selectively compressed between the mounting surface of the body member and the support surface when the body member is attached to the support surface. The adhesive retaining member

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extending rearwardly from the mounting surface may be made of a suitable material, such as flexible foam or flexible plastic.

5 Typically, the rearward facing mounting surface of the load-bearing support device is generally planar. The mounting surface may include a shallow recess which acts as an adhesive retaining member to contain the adhesive material when the frangible capsule means ruptures as the body member is secured to the support surface. Depending on the type and amount of adhesive, the adhesive material may substantially fill the recess when the body member is secured to the support surface. If the frangible capsule means is attached to the rearward facing mounting surface and a shallow recess is used, the frangible capsule means is attached within the shallow recess.

20 To aid in the rupture of the frangible capsule means, the mounting surface may be configured to rupture the capsule when pressure is applied to the frangible capsule means. One suitable configuration includes one or more serrations.

25 A support device incorporating the present invention may be affixed to a wide variety of support surfaces in a variety of ambient conditions, e.g., in humid or a moisture-laden environment. In accordance with the present it is contemplated that the adhesive material dispensed from the frangible capsule means provide the primary bond between the support device and the support surface.

30 Numerous other features and advantages of the present invention will become readily apparent from the following detailed description of the invention and embodiments thereof, from the claims, and from the accompanying drawings in which the details of the invention are fully and completely disclosed as a part of this specification.

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While the present invention is susceptible of embodiment in various forms, numerous other features and advantages of the present invention will become readily apparent from the accompanying
5 drawings, in which the details of the invention are fully and completely disclosed as a part of this specification, from the following detailed description of a preferred embodiment of the invention and one or more alternative embodiments
10 thereof with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the specific
embodiments illustrated.

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Brief Description of the Drawings

FIGURE 1 is an elevational view, partially in cross-section, of one embodiment of a load-bearing support device incorporating the present invention;

5 FIGURE 2 is a perspective view of the load-bearing support device illustrated in FIGURE 1;

FIGURE 3 is a perspective view of a another embodiment of a load-bearing support device incorporating the present invention;

10 FIGURE 4 is an elevational view, partially in cross-section, of yet another embodiment of a load-bearing support device incorporating the present invention;

15 FIGURE 5 is an elevational view, partially in cross-section, of an embodiment of a load-bearing support device incorporating the present invention and adhesively secured to a support surface;

20 FIGURES 6-11 are elevational views, partially in cross-section, of additional alternative embodiments of a load-bearing support device in accordance with the present invention; and

25 FIGURES 12 and 13 are diagrammatic views of an adhesive capsule forming part of the support device incorporating the present invention.

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Detailed Description of the Preferred Embodiment

While the present invention is susceptible of embodiments in various forms, there is shown in the drawings and will hereinafter be described
5 presently preferred embodiments thereof, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention, and is not intended to limit the invention to the specific embodiments illustrated.

10 As illustrated in the drawings, in accordance with the present invention, there is provided a load-bearing support device 20, such as a hook, soap dish, towel bar, bathroom fixture, and the like, for attachment to a support surface 22, such as
15 a wall or door. The support surface may be horizontal, vertical or angled. Generally, the support device 20 includes a body member 24 having a forward facing load bearing surface or portion 26 and a rearward facing mounting surface 28. The body
20 member 24 may be rigid and is made of a suitable material, such as plastic. The body member 24 may be made by conventional means, such as by molding.

An embodiment of the present invention which incorporates the present invention will first
25 be described in reference to FIGURES 1 and 2. In FIGURE 1, the mounting surface 28 is shown as generally square. However, it is to be understood that the mounting surface 28 may take other regular and irregular shapes, for example, rectangular or
30 diamond shaped. The forward facing surface 26 includes suitable means for attaching an object to the support device 20, such as a hook 30.

The mounting surface 28 of the body member 24 has frangible capsule means 32 in the form of a
35 single capsule 34 secured thereto by suitable means, such as adhesive 36. The frangible capsule 34 includes an outer wall 38 which defines at least one

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compartment therein for an adhesive material. The capsule 34 is made of an appropriate frangible material.

5 The capsule means 32 may be made of a material that will dissolve in the adhesive material once the capsule means 32 is ruptured, as described hereinbelow. Alternatively, the capsule remnants remain in place and is surrounded by the adhesive adhering to the body member 24 of the support device 10 20 and the support surface 22. Each capsule forming capsule means 32 may include a seam (not shown) having weak points so that the capsule may be ruptured around its perimeter when pressure is applied to the capsule.

15 In FIGURE 1, the mounting surface 28 includes a shallow recess 40. The shallow recess 40 illustrated in the drawings is enlarged for clarity. The shallow recess 40 may be manufactured by various known molding techniques, e.g., such as one disclosed 20 in U.S. Patent No. 4,466,787 to Ragir et al. The shallow recess 40 may have a variety of shapes. The shallow recess 40 illustrated in FIGURES 1 & 2 has a cross-sectional shape that is generally circular. The frangible capsule means 32 is attached within the 25 shallow recess 40.

 After the capsule means 32 is ruptured, as described hereinbelow, the adhesive material flows into and is confined within the shallow recess 40. The adhesive material may substantially fill the 30 recess 40 when the support device 20 is secured to the support surface 22, depending on the type and amount of adhesive material used.

 As shown in FIGURE 2, the frangible capsule 34 is generally positioned near the center of the 35 recess 40 formed in mounting surface 28. However, it is to be understood that the frangible capsule 34 is not limited to the illustrated placement.

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Preferably, however, the frangible capsule 34 is located at a position that is near the center or at the center so that the capsule 34 is easily ruptured. Also, this placement causes the adhesive material to
5 flow along a substantial portion of the mounting surface 28 when the capsule means 32 is ruptured as described hereinbelow.

The embodiments shown FIGURES 3-11, each of which incorporates the present invention, are similar
10 to the embodiment shown in FIGURE 1. As such, only the differences will be described herein.

The mounting surface 28' of the load-bearing support device 20 shown in FIGURES 3 and 4 is generally planar. In FIGURES 3 and 4, the load-bearing support device 20 includes an adhesive
15 retaining member 42, 42', respectively, attached to the mounting surface 28'. The adhesive retaining member 42 generally surrounds the frangible capsule 34 and the area intended to receive the adhesive.

The adhesive retaining members 42, 42' are made of suitable materials. The adhesive retaining members 42 illustrated in FIGURE 3, for example, is a flexible foam. The adhesive retaining member 42' illustrated in FIGURE 4, for example, is made of a
25 flexible plastic. Other materials and configurations, such as an O-ring (not shown) may also be suitable. The adhesive retaining members 42, 42' are usually provided when a lower viscosity adhesive is used. As shown in FIGURE 5, an adhesive
30 retaining member, such as retaining member 42, can also be used when a shallow recess 40'' is formed in the mounting surface 28''.

As illustrated in FIGURE 5, the adhesive retaining member 42 functions to prevent leakage of
35 the adhesive material 44 and to contain the adhesive material 44 therewithin after the capsule means 32 has been ruptured. In FIGURE 5, the adhesive

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retaining member 42 is substantially compressed between the mounting surface 28 of the body member 24 and the support surface 22 when the support device 20 is attached thereto.

5 In the embodiment of the support device incorporating the present invention shown in FIGURE 6, the mounting surface 28' of the body member 24 has frangible capsule means 32 in the form of multiple capsules 46, 48 stacked on top of each other. One of
10 the frangible capsules 46 is secured to the planar mounting surface 28' of the body member 24 by suitable means, such as adhesive 36. The other capsule 48 is stacked on top of the capsule 46 and secured to the capsule 48 by suitable means, such as
15 adhesive. While two capsules are shown in the drawings, it is to be understood that multiple adhesive capsules may be stacked on top of each other. It is also to be understood that multiple capsules function in the same manner as a single
20 capsule as described hereinbelow.

In the embodiment of the support device incorporating the present invention shown in FIGURE 7, the body member 24 has frangible capsule means 32 in the form of two frangible capsules 50, 52 secured
25 within the recess 40 in the mounting surface 28. Each frangible capsule 50, 52 is secured to the recess by suitable means, such as adhesive 36. While two capsules are illustrated in FIGURE 7, it is within the purview of the present invention that more
30 than two capsules may be used. It is to be understood that multiple capsules function in a similar manner to a single capsule as described hereinbelow.

35 In FIGURE 8, the recess 40' formed in the mounting surface 28'' of the body member 24 may be configured to aid in the rupture of the capsule means 32 when the support device 20 is pressed against the

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support surface. The recess 40' in the mounting surface 28'' includes portions 54, such as serrations. When the mounting surface 28'' is moved to engage the support surface 22, the frangible capsule means 32 contacts and is ruptured by serrations 54 puncturing the capsule means 32.

In FIGURE 9, the generally planar mounting surface 28a is formed with an adhesive absorbent material 56 made of a fibrous material, such as wood or fabric, which is molded to the back surface as disclosed in U.S. Patent No. 4,466,787 to Ragir et al. (without the disclosed adhesive coating). The frangible capsule means 32 is secured to the mounting surface 28a of the adhesive absorbent material 56 by suitable means, such as adhesive 36. An adhesive retaining member 42 is attached to the mounting surface 28a of the adhesive absorbent material 56 by suitable means, such as adhesive, and functions in the above described manner.

The embodiment of the support device incorporating the present invention shown in FIGURE 10, is similar to the embodiment shown in FIGURE 3, except that the body member 124 of the support device 120 incorporates a support plate 158 of the type, for example, shown in U.S. Patent No. 3,848,843 to Levy. The mounting surface 128, as illustrated, is circular. However, it is to be understood that the mounting surface 128 may take other regular and irregular shapes, for example, rectangular or diamond shaped.

In the embodiments shown in FIGURES 1-10, which incorporate the present invention, the frangible capsule means 32 is captured between the mounting surface of the support device 20, 120 and the support surface 22 when the mounting surface is moved to engage the support surface 22 to which the support device 20, 120 is to be attached. The

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frangible capsule means 32 is ruptured when the support device 20, 120 is pressed against the support surface 22.

5 After the capsule means 32 is ruptured, the adhesive material flows onto the mounting surface of the body member. The adhesive material creates a bond between the mounting surface and the support surface. Significantly, the adhesive material is the primary means, and usually the only means, for
10 adhering the support device to the support surface. That is, no other adhesive material is necessary to bond the support device to the support surface.

The embodiment of the support device incorporating the present invention shown in FIGURE
15 11 is similar to the embodiment shown in FIGURE 10 in that the body member 224 incorporates a similar support plate 258, e.g., of the type shown in U.S. Patent No. 3,848,843 to Levy, and the mounting surface 228 is circular.

20 As shown in FIGURE 11, the forward facing surface 226 of the body member 224 has frangible capsule means 232 in the form of multiple capsules 260, 262 stacked on top of each other. One of the frangible capsules 260 is secured to the forward
25 facing surface 228 of the body member 224 by suitable means, such as adhesive. The other capsule 262 is stacked on top of the capsule 260 and secured to the capsule 260 by suitable means, such as adhesive. While two capsules are shown in the drawings, it is
30 to be understood that multiple adhesive capsules may be stacked on top of each other or that a single capsule may be used. It is also to be understood that multiple capsules function in the same manner as a single capsule as described hereinbelow.

35 The body member 224 includes a plurality of passages 266 therethrough to provide a passageway for the adhesive material so that the adhesive material

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may flow onto the mounting surface 228 after the frangible capsules 260, 262 have been ruptured so as to bond the support device 220 to the support surface. A flexible diaphragm 268 is sealed to the forward facing surface 226 of the body member 224 and the capsule means 232 is captured between the diaphragm 268 and the forward facing surface 226. The diaphragm 268 is made of suitable materials, such as plastic.

The load-bearing support device 220, shown in FIGURE 11, includes an adhesive retaining member 242 attached to the mounting surface 228 which generally surrounds the passages 266. The adhesive retaining member 242 functions to contain the adhesive material therein after the capsule means 232 ruptures.

The exposed surface of the adhesive retaining member 242 includes a secondary adhesive 270, which may be a contact adhesive, on the rearmost end of the adhesive retaining member 242. The secondary adhesive 270 is typically protected prior to use by a release member, as is known. The secondary adhesive 270 allows a user to initially position the support device 220 while attaching the support device 220 to the support surface. It is to be understood that the secondary adhesive 270 does not provide a permanent bond that is capable of sustaining a load. However, initially, when the support device 220 is being positioned on the support surface, the secondary adhesive 270 will support the support device 220 on the support surface so that a user will not have to hold the support device 220 while the adhesive material cures.

In the embodiment shown in FIGURE 11, the capsule means 232 is ruptured when pressure is applied to the exposed surface of the diaphragm 268 which, in turn, applies pressure to the capsule means

232. The adhesive material that is formed, as described hereinbelow, is forced through the passages 266 as pressure is applied to the exposed surface of the diaphragm 268. After passing through the passages 266, the adhesive material flows onto the mounting surface 228 to bond the support device 220 to the support surface. The adhesive material creates a bond between the mounting surface 228 and the support surface. Importantly, the adhesive material is the primary means, and usually the only means, for permanently adhering the body member 224 to the support surface. That is, no other adhesive material is necessary to bond the support device 220 to the support surface.

The adhesive material used in the capsule means may be made of a wide variety of adhesives. Since the adhesive material is contained within the capsule means, the adhesive material may be of a viscous nature. The adhesive material may be aqueous or non-aqueous. Examples of suitable materials for the adhesive material are epoxy, acrylic, cyanoacrylate, butyl, nitrile, silicone, polyurethane or other rapid curing systems. The preferred adhesive is a multi-component adhesive in the polyurethane family. Thus, an adhesive material that would be suitable for adhering the support device to a support surface in a moisture-laden or humid environment could be used. Furthermore, since the adhesive material is housed in capsule means, a type of adhesive material that may not be suitable for human interaction or more aggressive adhesives may be used.

The adhesive material may be made of one component or of multiple components. If a one component adhesive is used, the adhesive may be housed in the compartment defined by the outer wall 38. Alternatively, if a one component adhesive is

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used, shown as "A" in FIGURE 12, the one component adhesive may be housed in a plurality of compartments 74 separated by a plurality of membranes or inner walls 76 within the outer wall 38 of each frangible capsule. It is envisioned that only a single inner wall may be used. The inner walls 76 are stronger than the outer wall 38. Thus, when pressure is applied to the frangible capsule means 32 as described hereinabove, the outer wall 38 ruptures and the compartments 74 act to dispense the adhesive material in an even distribution along the mounting surface.

If a multiple component adhesive is used in a single capsule, the adhesive components, shown as "A" and "B" in FIGURE 13, are housed in compartments 80 and separated from each other by membranes or inner walls 82. A single inner wall may be used or a plurality of inner walls may be used. The inner walls 82 are rupturable when pressure is applied to the frangible capsule means 32 as described hereinabove. The inner walls 82 are arranged such that one end of each wall 82 is adjacent the mounting surface of the body member. Thus, upon pressure to the capsules which comprise the capsule means 32, the inner walls 82 buckle and rupture. When the inner walls 82 rupture, the adhesive components A, B mix together to form the adhesive material. The inner walls 82 rupture prior to the rupture of the outer wall 38 of each of the capsules which comprise the frangible capsule means 32. After the inner walls 82 have ruptured and the adhesive material has formed, the outer wall 38 ruptures and dispenses the adhesive material onto the rearwardly facing surface.

If a plurality of capsules are used, each capsule may contain a one component adhesive or a multiple component adhesive and function in the same manner as described hereinabove. Alternatively, each

capsule may contain a separate component of a multiple component adhesive material which is contained within the compartment created by the outer wall 38. When pressure is applied to the capsule means 32, each capsule ruptures and the components A, B are dispensed and mix together to form the adhesive material.

As illustrated in the drawings, any combination of the above described features may be used. From the foregoing, it will be observed that numerous modifications and variations can be effected without departing from the true spirit and scope of the novel concept of the present invention. It is to be understood that no limitation with respect to the specific embodiments is intended or should be inferred. The disclosure is intended to cover by the appended claims all such modifications as fall within the scope of the claims.

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The Invention Claimed is:

1. A load-bearing support device for attachment to a support surface, said support device comprising:

a body member having a rigid rearward facing surface for engagement with the support surface;

frangible capsule means comprising at least one frangible capsule secured to said rearward facing surface of said body member, said frangible capsule means containing at least one component of an adhesive material therein; and

said frangible capsule means being captured between and rupturable as said rearward facing surface is moved to engage the support surface to which said support device is to be attached to form an adhesive material upon said rearward facing surface and contacting the support surface, said adhesive material being the primary means for adhering said body member to the support surface.

2. A load-bearing support device as defined in claim 1, wherein said frangible capsule means comprises a plurality of frangible capsules attached to said rearward facing surface of said body member, each frangible capsule containing at least one component of an adhesive material.

3. A load-bearing support device as defined in claim 2, wherein each of said plurality of frangible capsules contains at least one component of a multi-component adhesive material therein, the adhesive components mixing together to form the adhesive material for adhering said rearward facing surface to said support surface.

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4. A load-bearing support device as defined in claim 1, wherein said frangible capsule means comprises a plurality of frangible capsules, said frangible capsules being stacked on each other and secured to each other with one of said frangible capsules being attached to said rearward facing surface of said body member, each of said frangible capsules containing at least one component of an adhesive material.
5. A load-bearing support device as defined in claim 4, wherein each of said plurality of frangible capsules contains at least one component of a multi-component adhesive material therein, the adhesive components mixing together to form the adhesive material for adhering said rearward facing surface to said support surface.
6. A load-bearing support device as defined in claim 1, wherein said body member includes an adhesive absorbent material attached to said rearward facing surface, said frangible capsule means being attached to said material.
7. A load-bearing support device as defined in claim 6, wherein said material is fibrous.
8. A load-bearing support device as defined in claim 1, wherein said adhesive material is made of one adhesive component.
9. A load-bearing support device as defined in claim 8, wherein said adhesive component is separated by a plurality of inner walls within an outer wall of said frangible capsule means, said inner walls defining compartments within said outer wall, said outer wall being rupturable to release the adhesive

material for adhering said rearward facing surface of said body member to the support surface, said compartments acting to evenly distribute the adhesive material over said rearward facing surface to bond the support device to the support surface.

10. A load-bearing support device as defined in claim 1, wherein said adhesive material is made of at least two separate adhesive components, said components being separated by at least one inner wall within an outer wall of each said frangible capsule forming said frangible capsule means, said inner wall defining compartments within said outer wall.

11. A load-bearing support device as defined in claim 10 wherein, said inner wall of each said frangible capsule being rupturable prior to said outer wall thereof when said frangible capsule means is captured between said rearward facing surface and the support surface to mix the adhesive components together to form the adhesive material, said outer wall being rupturable thereafter for releasing the adhesive material for adhering said body member to said support surface.

12. A load-bearing support device as defined in claim 1, wherein said frangible capsule means is adhesively secured to said rearward facing surface.

13. A load-bearing support device as defined in claim 1, including a member attached to said rearward facing surface and generally surrounding said frangible capsule means for containing the adhesive material therewithin after said frangible capsule means has been ruptured.

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14. A load-bearing support device as defined in claim 13, wherein said member is selectively collapsible against said rearward facing surface of said body member when said body member is adhered to the support surface.

15. A load-bearing support device as defined in claim 13, wherein said member is made of flexible foam.

16. A load-bearing support device as defined in claim 13, wherein said member is made of flexible plastic.

17. A load-bearing support device as defined in claim 1, wherein said rearward facing surface is planar.

18. A load-bearing support device as defined in claim 1, wherein said rearward facing surface includes a shallow recess, said frangible capsule means being attached within said shallow recess, said adhesive material being generally confined within said shallow recess when said frangible capsule means is ruptured and said support device is attached to the support surface.

19. A load-bearing support device as defined in claim 18, wherein said adhesive material substantially fills said recess when said support device is attached to the support surface.

20. A load-bearing support device as defined in claim 1, wherein said rearward facing surface of said body member is configured to rupture said frangible capsule means when said rearward facing surface is moved to engage said support surface.

21. A load-bearing support device as defined in claim 20, wherein the configuration of said rearward facing surface includes at least one serration to rupture said frangible capsule means.

5

22. A load-bearing support device for attachment to a support surface, said support device comprising:

10 a body member having a rearward facing surface for engagement with the support surface; frangible capsule means comprising a plurality of frangible capsules having at least one frangible capsule secured to said rearward facing surface of said body member, each of said frangible capsules containing at least one component of an adhesive material therein; and

15 said frangible capsule means being captured between and rupturable as said rearward facing surface is moved to engage the support surface to which said support device is to be attached to form an adhesive material upon said rearward facing surface, said adhesive material being the primary means for adhering said body member to the support surface.

25

23. A load-bearing support device as defined in claim 22, wherein each of said plurality of frangible capsules are attached to said rearward facing surface of said body member, each frangible capsule containing at least one component of an adhesive material.

30

24. A load-bearing support device as defined in claim 23, wherein each of said plurality of frangible capsules contains at least one component of a multi-component adhesive material therein, the adhesive components mixing together to form the adhesive

35

material for adhering said rearward facing surface to said support surface.

5 25. A load-bearing support device as defined in claim 22, wherein said plurality of frangible capsules are stacked on each other and secured to each other with one of said frangible capsules being attached to said rearward facing surface of said body member, each of said frangible capsules containing at
10 least one component of an adhesive material.

15 26. A load-bearing support device as defined in claim 25, wherein each of said plurality of frangible capsules contains at least one component of a multi-component adhesive material therein, the adhesive components mixing together to form the adhesive material for adhering said rearward facing surface to said support surface.

20 27. A load-bearing support device as defined in claim 22, wherein said adhesive material is made of one adhesive component, said adhesive component being separated by a plurality of inner walls within an outer wall of each of said frangible capsules, said
25 inner walls defining compartments within said outer wall, said outer wall being rupturable to release the adhesive material for adhering said rearward facing surface of said body member to the support surface, said compartments acting to evenly distribute the
30 adhesive material over said rearward facing surface to bond the support device to the support surface.

35 28. A load-bearing support device as defined in claim 22, wherein said adhesive material is made of multiple adhesive components, said components being separated by at least one inner wall within an outer wall of each of said frangible capsules, said inner

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wall defining compartments within said outer wall,
said inner wall of each said frangible capsule being
rupturable prior to said outer wall thereof when said
frangible capsule means is captured between said
5 rearward facing surface and the support surface to
mix the adhesive components together to form the
adhesive material, said outer wall being rupturable
thereafter for releasing the adhesive material for
adhering said body member to said support surface.

10 29. A load-bearing support device as defined in
claim 22, wherein said rearward facing surface is
planar.

15 30. A load-bearing support device as defined in
claim 29, including a member attached to said
rearward facing surface and generally surrounding
said frangible capsule means for containing the
adhesive material therewithin after said frangible
20 capsule means has been ruptured.

31. A load-bearing support device as defined in
claim 22, wherein said rearward facing surface
includes a shallow recess, said frangible capsule
25 means being attached within said shallow recess, said
adhesive material being generally confined within
said shallow recess when said frangible capsule means
is ruptured and said support device is attached to
the support surface.

30 32. A load-bearing support device for
attachment to a support surface, said support device
comprising:

35 a body member having a rearward facing
surface for engagement with the support surface and a
forward facing surface, said body member having
passages therethrough;

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frangible capsule means comprising at least one frangible capsule secured to said forward facing surface of said rigid body member, said frangible capsule means containing at least one component of an adhesive material therein;

a flexible diaphragm attached to said forward facing surface, said frangible capsule means being captured between said diaphragm and said forward facing surface;

said frangible capsule means being rupturable when pressure is applied to the diaphragm after said rearward facing surface engages the support surface to which said support device is to be attached to form an adhesive material that passes through said passages and onto said rearward facing surface, said adhesive material being the primary means for adhering said body member to the support surface.

33. A load-bearing support device as defined in claim 32, wherein said support member is rigid.

34. A load-bearing support device as defined in claim 32, wherein said adhesive material is made of one adhesive component.

35. A load-bearing support device as defined in claim 32, wherein said adhesive material is made of multiple adhesive components, said components being separated by at least one inner wall within an outer wall of each said frangible capsule forming said frangible capsule means, said inner wall of each said frangible capsule being rupturable prior to said outer wall thereof when pressure is applied to the diaphragm to mix the adhesive components together to form the adhesive material, said outer wall being rupturable thereafter for releasing the adhesive

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material for adhering said body member to said support surface.

5 36. A load-bearing support device as defined in claim 32, wherein said frangible capsule means comprises a plurality of frangible capsules each attached to said forward facing surface of said body member, said plurality of capsules being captured between said diaphragm and said forward facing surface, each frangible capsule containing at least one component of an adhesive material.

15 37. A load-bearing support device as defined in claim 32, wherein said frangible capsule means comprises a plurality of frangible capsules, said frangible capsules being stacked on each other and secured to each other with one of said frangible capsules being attached to said forward facing surface of said body member, said plurality of frangible capsules being captured between said forward facing surface and said diaphragm, each of said frangible capsules containing at least one component of an adhesive material.

25 38. A load-bearing support device as defined in claim 37, wherein each of said plurality of frangible capsules contains at least one component of a multi-component adhesive material therein, the adhesive components mixing together to form the adhesive material for adhering said rearward facing surface to said support surface.

35 39. A load-bearing support device as defined in claim 32, including a member attached to said rearward facing surface and generally surrounding an open end of said passages for containing the adhesive

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material therewithin after said frangible capsule means has been ruptured.

- 5 40. A load-bearing support device as defined in claim 39, wherein said member includes a secondary adhesive on an end of said member for initially positioning the support device on the support surface.

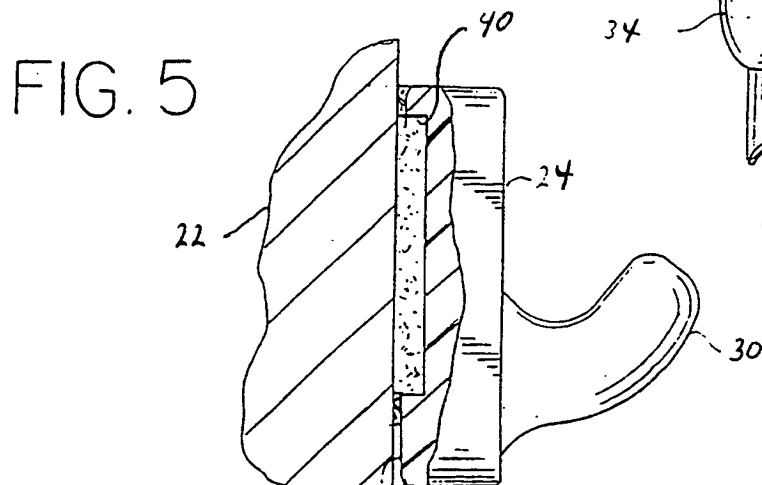
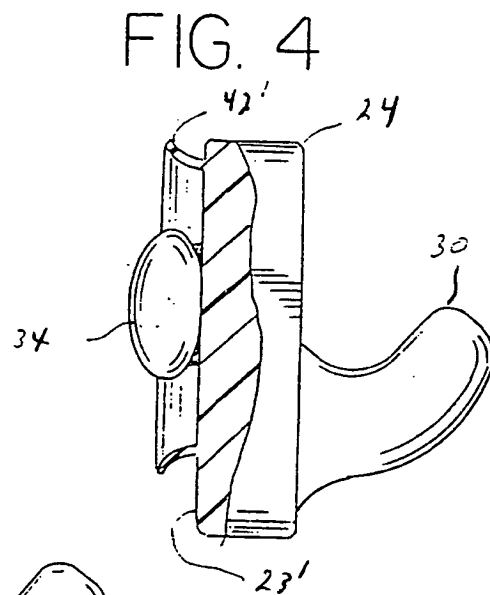
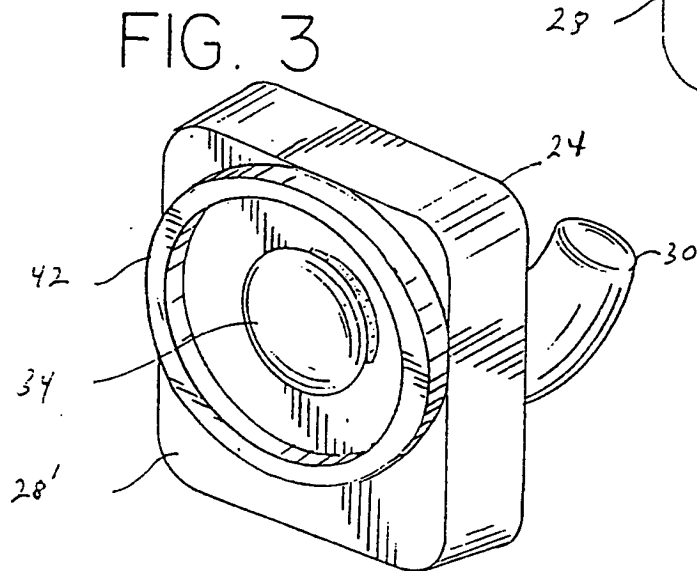
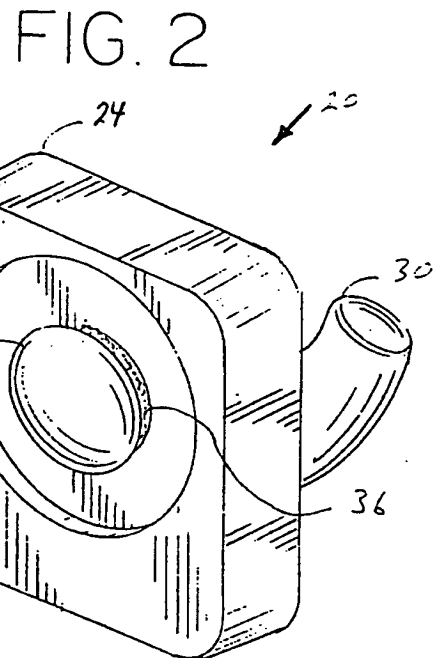
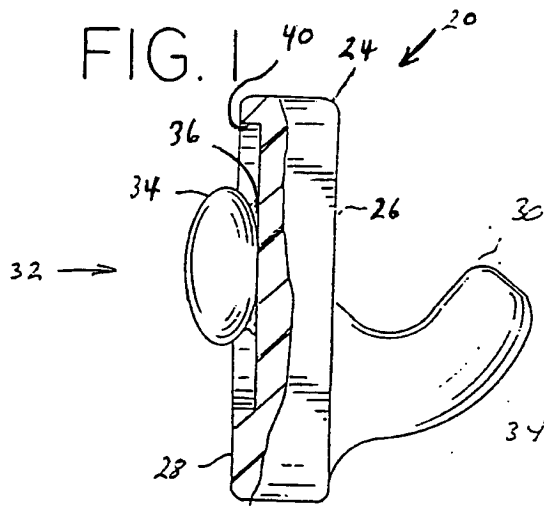


FIG. 6

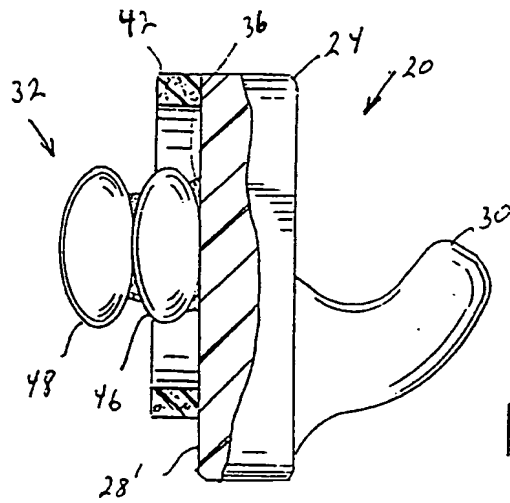


FIG. 7

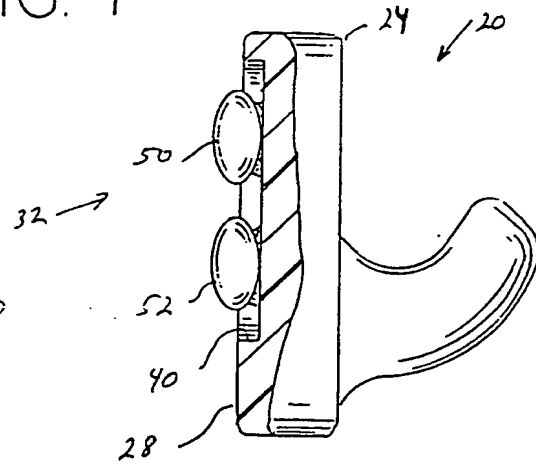


FIG. 9

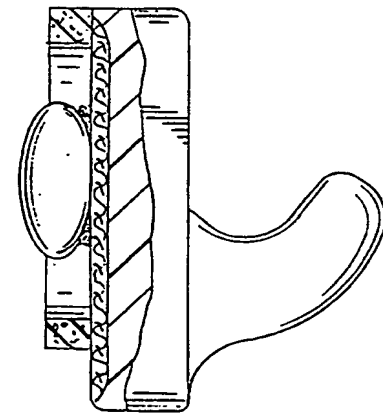


FIG. 8

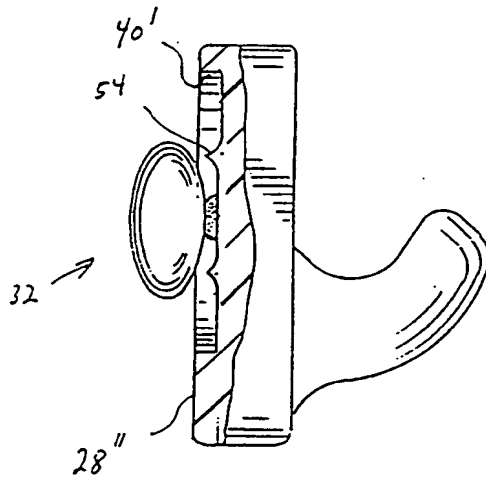


FIG. 10

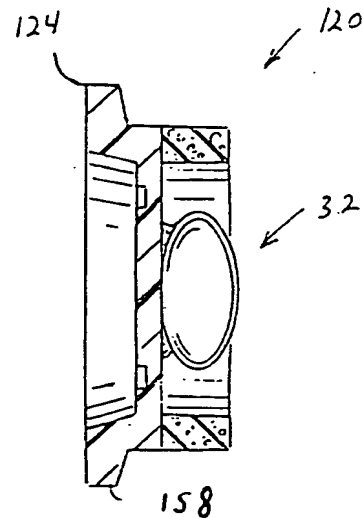


FIG. 11

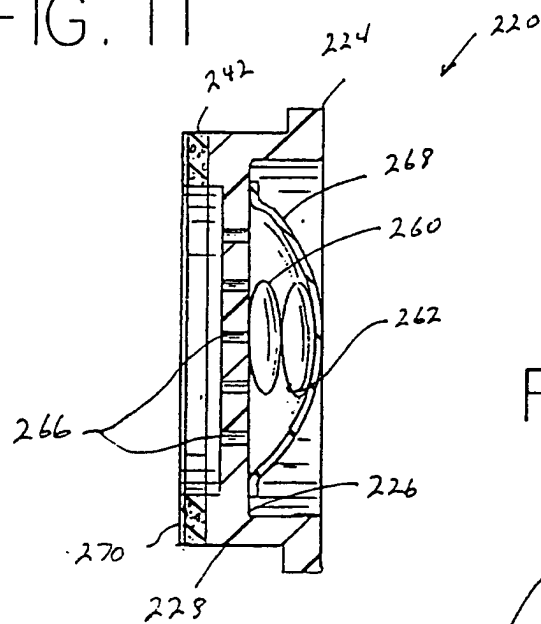


FIG. 12

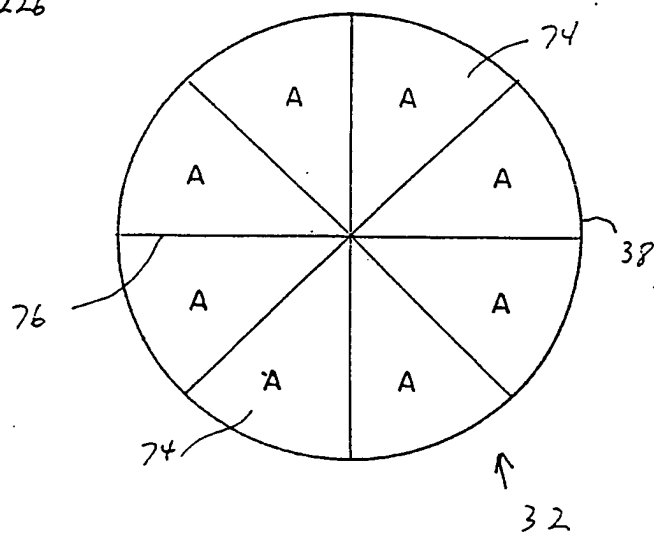
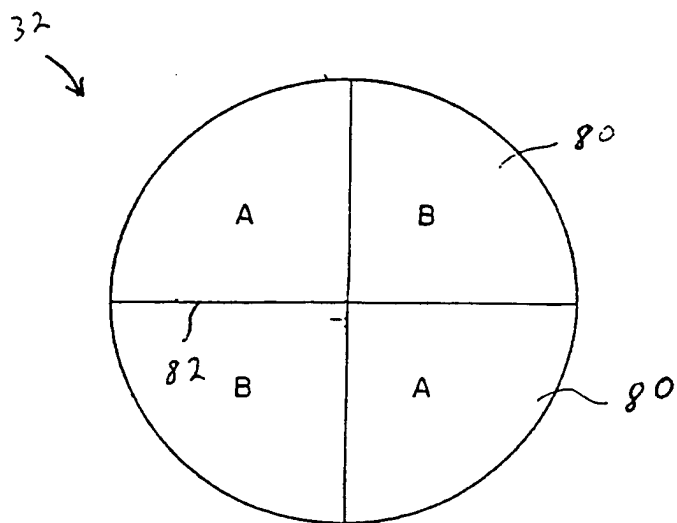


FIG. 13



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US94/11191

A. CLASSIFICATION OF SUBJECT MATTER IPC(6) : A47B 29/00 US CL : 248/205.3 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 248/205.3, 205.4, 683; 206/813; 414/904; 24/304, Dig 11 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 2,557,434 (HOVERDER) 19 June 1951, whole document Fig. 1	1-9, 12, 17-20, 22-27, 29, 31
Y	US, A, 2,679,998 (KELLER) 01 June 1954 see figures 1-13	1-9, 12, 17-20, 22-27, 29, 31
Y	US, A, 3,504,878 (DRESSLER) 07 April 1970, see Fig. 1 elements 26, 28	1-9, 12, 17-20, 22-27, 29, 31
Y	US, A, 4,076,774 (SHORT) 28 February 1978, see figure	3, 5, 9, 22-27, 29, 31
Y	US, A, 4,466,787 (RAGIR ET AL.) 21 August 1984, see Fig. 3	18, 19
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents: *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art *&* document member of the same patent family	
Date of the actual completion of the international search 31 OCTOBER 1994		Date of mailing of the international search report 15 NOV 1994
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer <i>my Meas</i> RAMON O. RAMIREZ Telephone No. (703) 308-2168

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